those of type III.; if this colour was visible in stars of the other two types, they were always near the horizon. Yellow was rarely absent; yellow of greater or lesser brightness predominated completely in a large number of stars when they were high above the horizon and had ceased to scintillate. Orange is very frequent amongst the colours of the stars of the third type, while they scintillate.

If we reflect upon this short sketch of the changes of colour of scintillating stars, we see at once how complicated this phenomenon is, and that, in order to obtain data of tolerable certainty, at least two series of observations must be made, one in dry and the other in rainy weather; and further, that the influence of the star's altitude must be determined, which can be done by dividing the observations into separate zones of five degrees each.

With regard to the colours of scintillating stars Arago has expressed the opinion that the colour observed at any special moment is the complementary colour to those rays of the light peculiar to the scintillating star which at that moment are absent in the eye or in the telescope. M. Montigny agrees with this view and confirms it by an observation which he made when, on some evening specially favourable for observation, he inserted a prism just when the circle produced in the scintillometer by the light of the star Capella was very sharp and showed bright colours; he then found the two arcs of the circle divided into different colours, and this could not have been the case if the colours seen without the prism had actually been present. M. Montigny, however, intends further to examine this question by means of the spectroscope.

Arago also raised the well-known question whether the scintillation of stars is the same for two observers stationed at different places. M. Montigny replies to this question in the negative, and this was Arago's opinion also; he found the colours of a star to be different for those rays which are differently refracted by the two halves of the object-glass. In the same sense M. Donders has noticed that the scintillation does not always show the same peculiarities for each eye of the same observer. Another circumstance may be cited here as another proof, viz., that a double star, both components of which are of the same colour, such as Castor and its companion, which are both white, does not always show the same colours in the scintillometer at the same angles of position. Although the angle separating these two stars amounts to but five seconds of arc, it yet suffices to produce different colours. This shows how greatly the appearance of stars in the scintillometer is affected by the smallest differences in the conditions under which they are observed, since two separate pencils of rays of the same colour travelling side by side and at the same moment may yet be changed to different colours on their passage through the atmosphere.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

THE subject of the use and abuse of examinations is beginning to be agitated in Austria. Within a few weeks past, two students, one at Pest and the second at Graz, have committed suicide after failing to pass examinations for the doctor's degree. The latter of the two had completed a lengthy course of study, and was an assistant of recognised ability in the university.

DURING the past few years the educational institutions of Rome have been entirely reorganised. The university, as constituted at present, is without a theological faculty. It numbers sixty-four professors, twelve in the legal faculty, twenty-four in the medical, sixteen in the scientific, and twelve in the philological-philosophical. Nearly all the conveniences of a well-appointed university are now enjoyed by the students: a botanical garden, laboratories for physics, chemistry, and physiology; the new observatory on the Capitoline, with special institutes for geology, mineralogy, mathematical physics, pharmacy, comparative zoology and anatomy, pathological anatomy, and six clinics. During the past month the Minister of Education has issued a decree for the foundation of a school of archæology, which shall be amply equipped, and meet a want long felt in this centre of archæological investigation.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, May 23.—"Experimental Results relating to the Rhythmical and Excitatory Motions of the Ventricle of the Heart of the Frog, and of the Electrical Phenomena which accompany them," by J. Burdon Sanderson, M.D., F.R.S., and F. J. M. Page, B.Sc., F.C.S.

This paper, although of some length, is a condensed statement of experimental results, so that it scarcely admits of being abstracted. These relate, as stated in the first paragraph, to (1) the order and duration of the rhythmical and excitatory motions of the heart of the frog, (2) the normal electrical condition of the surface of the heart and the influence thereon of mechanical, chemical and thermal injuries, and (3) the characters of the normal and of the excitatory electrical variations, and the modifications of those characters which are induced by injuries of the surface, and under the temporary influence of radiant heat. As we have not space to reproduce the whole, we will confine ourselves chiefly to the very interesting experiments contained in the two last sections.

The authors begin this part of the subject with the statement that they have confirmed, by repeated experiment, the observations made by Engelmann in 1873, that all parts of the surface of the "resting" heart are equipotential, and that the electrical inequalities which are usually found whenever the surface of the organ is investigated, when in this condition, owe their existence to slight injuries; they then proceed to discuss the conditions which lead to the existence of electrical differences. These are (1) permanent injury of the surface, however superficial and slight in extent, and (2) the temporary influence of radiant heat. As regards permanent injury, their observations are substantially in accordance with the conclusions of Hermann as regards other excitable and contractile tissues, viz., that the death of a part renders it *negative* to all living parts of the same organ. Substituting for the word death (which, in order to express the whole truth, must be understood to include every degree of local lesion, however limited in extent or slight in degree) the expression "permanent injury," this proposition becomes adequate for its purpose.

The authors further find that the influence of radiant heat produces a modification of the electrical condition of a part, of which the sign is opposed to that of the electrical change produced by injury. They were led to this result by the consideration that if arrest of the chemical changes which constitute the life of a part renders it negative, it is probable that a momentary intensification of these changes will render it positive.

The fundamental experiment by which both facts are established is as follows:—Two points on the surface of the heart, which may be as near to each other as two millims., are connected with a galvanoscopic circuit, and found to be equipotential. A loop of platinum wire, heated by a current, is brought into the neighbourhood of one of them for one second. After an interval of about a second the warmed surface becomes positive: in a few moments this effect subsides. If, then, the hot wire is brought nearer so as to scorch the surface, however slightly, and then removed, the opposite effect—that of permanent injury—manifests itself. The same spot, which was before positive, now becomes negative in a very much greater degree; for whereas the temporary "positivity" scarcely exceeds 1-2,000th Daniell, the "difference" of potential produced by injury may amount to 3-100ths Daniell. On the physiological meaning of these effects the authors do not enter. An indication of their bearing is, however, given by the observation in the next section, which relates to the so-called variation of the heart. By variation is meant the electrical disturbance which accompanies, or rather precedes, each contraction of the ventricle. The fact that such a disturbance exists has been known for several years. It has also been recognised that it precedes the visible change of form by which the systole discloses itself. The authors now show that the disturbance consists of two phases having opposite signs—that in the first phase, which is of short duration, parts near the apex become positive to parts further from it; that in the second phase the opposite condition is observed; further, that the first phase is entirely over before the ventricle begins its contraction, whereas the second phase corresponds in duration with the period during which the ventricle is doing the greatest amount of mechanical work, and ceases at the moment of decline of the muscular contraction of the ventricle. These time relations of the two phases suggest the inference that in all probability the first phase corresponds with that of the negative variation of ordinary muscle, with which it agrees in sign, and that the second phase is more immediately associated with the muscular contraction. That this is so appears to be shown by the observation that if any two points of the rhythmically pulsating heart *a* and *b*, of which *a* is nearest to the apex, are investigated by suitable means during the period of systole, it is found that the variation observed (in which, so long as the surface is in its normal state, *a* becomes negative to *b* in the second phase) is modified by momentarily warming (in the manner already described) as follows:—When *b* is warmed *a* still becomes negative in the second phase; but the extent of the deflection is four or five times as great as before. When *a* is warmed, instead of becoming negative in the second phase, it becomes positive; in other words, the second phase is reversed. Permanent injury (as *e.g.*, by the closer approach of the hot platinum wire) produces similar results, with this difference: that whereas the modifications produced by radiation are transitory, and in fact pass off in a few seconds, those caused by injury are of much longer duration. All these facts seem to show that there is an intimate relation between the second phase and the act of contraction. The nature of this relation is matter for further investigation.

Linnean Society, June 20.—Prof. Allman, F.R.S., president, in the chair.—Mr. W. Catell was elected a Fellow of the Society.—Dr. J. Gwyn Jeffreys exhibited and made remarks on specimens of a new species of *Virgularia*, dredged by himself and the Rev. A. M. Norman in the Osterfjord, Norway, and which Dr. Danielssen will further describe.—Some gourds, probably the fruits of *Lagenaria vulgaris*, from Pekin, were shown by Mr. J. R. Jackson, of Kew. These, which were quite ornamental in form, had had their figure given them while in the living state by their being inserted into moulds, thus growing to the pattern desired.—A notice of some shells dredged by Capt. St. John, R.N., in the Korean Strait, was read by Dr. J. Gwyn Jeffreys. Of fourteen species enumerated six are now, for the first time, found living in the North Pacific as well as the Atlantic. *Nucinella ovalis* and *Kellia pumila*, supposed extinct, are thus shown recently living in the Korean region. Six other species are already known as inhabiting both oceans. No less than nine of the fourteen species are Coralline Crag fossils. The author finds this collection supporting his formerly expressed view, that mollusca common to the North Atlantic and North Pacific oceans may have originated in high northern latitudes, and have found their way to Japan on the one side and Europe on the other by means of the bifurcation of the great Arctic current.—Chas. B. Clarke read a paper on two kinds of dimorphism in the Rubiaceæ. The group in question is well known to be largely dimorphic, the variations chiefly consisting in the length of the style and stamens. The author now records dimorphism as follows:—1. Where the point of insertion of the stamens is altered, being situate in one form high above the middle of the corolla tube, and in another form at the base of the corolla tube—that is, subepigynous instead of epicorolline. 2. Where there are two kinds of fruit, viz. (*a*) a large fruit corresponding to a sessile flower, &c., and (*b*) a small fruit corresponding to a peduncled flower.—The Secretary read, for Capt. W. P. Armit, some notes on the presence of *Tachyglossus* (= Echidna) and *Ornithorhynchus* in North and North-East Queensland. It is shown that the Echidna occurs at Bellenden Plains, 18° S. lat., which habitat appears to be the most northern limit yet recorded in the Australian continent. The Ornithorhynchus is also met with 150 miles west of Georgetown and on the Leichardt River, about 18° S. lat.—Some remarks on the Echidna skull accompanying the above paper were made by Dr. J. Murie. Its comparison showed that, in all particulars, it agreed with that of the common *E. hystix*, and that supposed to be specifically distinct, to wit, the *E. setosa*. The New Guinea Echidna (*Acanthoglossus Bruijnii*) presents marked characteristic differences from both.—Prof. Oliver communicated a paper by Mr. N. E. Brown on the stapeliæ of Thunberg's herbarium and descriptions of new genera. Of eleven species of stapelia of Thunberg's determination, five only properly belong to the genus as now understood, and six belong to five different genera, two of which (*Trichocaulon* and *Diplocyatha*) are now characterised for the first time. *Sarcocodon speciosum* from the Somali land, and *Huerniopsis decipiens* from South Africa, are curious plants, the genera and species receiving a formal description.—The abstract of a paper on the shell of the bryzoa, by Mr. Arthur W. Waters, was taken as read.—The main points of observations on the white whale (*Beluga leucas*) exhibited at the Westminster Aquarium, were given orally by Dr. J. Murie. These notes chiefly related to the times and manner of breathing, certain outward peculiarities, visual organs and movements of body and tail in progression round the tank, along with other physiological topics. Respiration in and out of the water is not identical as to times and manner. A fungus (*Saprolegnia ferax*, Smith), that lately known as the "salmon disease," grew in abundance on the body of the whale, and no doubt acted prejudicially to the animal's health.

Mathematical Society, June 13.—Prof. H. J. S. Smith, F.R.S., vice-president, in the chair.—Mr. T. R. Terry was admitted into the Society, and Mr. J. D. H. Dickson was proposed for election.—Dr. Hirst, F.R.S., communicated a paper by M. Halphen, on the characteristics of systems of conics.—Mr. J. J. Walker read a paper on a method in the analysis of plane curves. This last paper was the development of a method of treating the intersections of a transversal with a plane curve which occurred to the author some years since; it contained, *inter alia*, a discussion, by the use of the method, of the problem of the inflexion-tangential curve for the quartic, with the determination of the co-ordinates of the tangential point in terms of the co-ordinates of the corresponding point of inflexion.—Mr. Tucker (hon. sec.) communicated the following papers:—On the calculus of equivalent statements, II., Mr. Hugh McColl; On the flexure of spaces, Mr. C. J. Monro; On the decomposition of certain numbers into sums of two square integers by continued fractions, Mr. S. Roberts, F.R.S.; On a new method of finding differential insolvents of algebraical equations, Mr. R. Rawson.—Questions were asked by Prof. Cayley, F.R.S. ("Has a solution been given of the statement that in colouring a map of a country, divided into counties, only four distinct colours are required, so that no two adjacent counties should be painted in the same colour?"); by Mr. Merrifield, F.R.S., on the uniform distribution of points in space; by Mr. Tucker, in connection with the announcement made in NATURE (vol. xvii. p. 104) of a second exception to Fermat's statement that all numbers of the form $2^m + 1$ are primes. The two exceptions now known are for $m = 5, 12$, in which cases $5 . 2^7 + 1$, $7 . 2^{14} + 1$ are factors respectively. Mr. Tucker suggested that $9 . 2^{21} + 1$, $11 . 2^{28} + 1$, &c., might be factors when $m = 19, 26$, &c.

Physical Society, June 8.—Prof. W. G. Adams, president, in the chair.—The following candidate was elected a Member of the Society:—Mr. R. H. Solly.—The Secretary read a paper by Prof. Hughes on the physical action of the microphone.—Sir John Conroy, Bart., M.A., read a paper on the light reflected by potassium permanganate. After referring to the results obtained by Haidinger and Stokes, and more recently by Wiedemann, he proceeded to describe his own experiments, which have been made by means of a very complete Babinet's goniometer provided with a vertical as well as a horizontal stage, so that the reflecting surface could be placed directly over the axis of the instrument. Sunlight, unpolarised or polarised in any plane by a Nicol, was used, and the moving arm of the instrument carried a direct-vision spectroscope with a "bright-spot" micrometer and a reflecting prism for bringing a second spectrum into the field. The colour of a surface, obtained by rubbing the crushed permanganate into a surface of ground glass with an agate burnisher, was found to vary with the nature of the light and its angle of incidence, and it further varied as the surface was immersed in benzene, bisulphide, or tetrachloride of carbon. With light polarised perpendicular to the plane of incidence, the dark bands in the reflected spectrum are far more distinct than when unpolarised or polarised perpendicularly to that plane. In the first of these three cases four bands are observed at angles less than 40°, and the blue end of the spectrum is very weak; as the angle of incidence increases the intensity of the blue rays diminishes: the dark bands gradually shift towards the blue end of the spectrum, and at about 60° a new band appears near D. With a still greater angle more of the blue rays are reflected and the bands fade away, those in the more refrangible part disappearing first. This displacement amounts approximately to 0·006 tenth-metre.—Prof. S. P. Thompson exhibited and described a cheap and efficient form of optical bench. Two straight oak bars, about two metres in length, are clamped together, as in a lathe-bed, and a number of slides carrying various appliances slide easily without shake, and can be fixed in any position by wedges. The several frames carrying the diffraction grating or edges, the eye-piece (with an engraved glass micrometer), &c., are so made, in wood, as to be capable of adjustment in any plane; and the instrument can also be employed for making photometric or other measurements. The mean of two determinations for the wave-length of certain red light gave 0·000629 as compared with Fresnel's figure, 0·000640, while the total cost did not exceed 3*l*.—The Secretary then read a paper by Prof. Ayrton, of the Imperial College of Tokio, Japan, on the electrical properties of beeswax and lead chloride. The index of refraction of the former substance increases in passing from the liquid to the solid state, and it therefore seems important, in connection with the electro-magnetic theory of light, to carefully measure the specific inductive capacity of a condenser made of wax, as it is cooled through its solidifying point. The rise in capacity, as the temperature falls from 80° C. to 60° C., is very striking, and the entire change was found to be in exact agreement with the changes known to occur in the index of refraction for light. An elaborate series of experiments was made, which sufficed to show that the results obtained were not due to any change in the distance apart of the plates (of copper) between which the wax was placed, caused by any shrinkage of this wax on solidifying. In consequence of a remark of M. Buff that lead chloride behaves as a metal, Prof. Ayrton has studied it as a dielectric, and he found a diminution of resistance by electrification; but as this result was not confirmed on subsequent experiment, the question was more fully investigated, when he found that, with an electromotive force under 1·75 volts, there is an increase in resistance, and above that amount there is a regular or irregular diminution. This limiting force is about that required to decompose water, and he concludes that the results obtained must be due to the damp contained in the lead chloride.

Entomological Society, June 5.—H. W. Bates, F.L.S., F.Z.S., president, in the chair.—Mr. J. A. Finzi exhibited a remarkable hermaphrodite specimen of *Anthocaris cardamines*.—Mr. Rutherford exhibited a series of large cocoons from Mount Camaroons, formed by the larvæ of a species of Bombyx allied to *Anapha panda*, Bdv. These cocoons varied in diameter from four to seven inches, and each one contained from 130 to 150 smaller cocoons, all of which were tenanted by a larva or chrysalis in various stages of development. It would appear that *Anapha panda*, like some other species of *Bombycidæ* is social, and that the larvæ unite to form an aggregate cocoon of sufficient strength to withstand the attack of enemies and probably extreme changes of temperature.—Mr. Rutherford also exhibited a specimen of a *Papilio* as a case of so-called "hermaphroditism", with asymmetrical markings on the wings which approached respectively *Papilio cynorta* and *Papilio Boisduvalianus*, thus creating an impression that those two forms were but the sexes of one species. These specimens were from the collection of Mr. F. J. Horniman.—Mr. Meldola exhibited photographs of two species of tropical orthoptera sent to Mr. Darwin by Dr. Zacharias as an illustration of protective resemblance in the very perfect leaf-like appearance of the fore-wings; and some small beetles of the genus *Spermophagus* and their cocoons, which had been found in a packet of seeds of *Cassio neglecta*, sent from Brazil by Dr. Fritz Müller to Mr. Darwin. The full-grown larvæ had emerged from the seeds, leaving the latter in a damaged condition, and had spun the small cocoons from which the beetles had issued, the insects having reached this country alive. Mr. Meldola also exhibited the proboscis of a sphinx moth caught by the narrow tube-like nectary of a pale yellow *Hedychium*, which had likewise been received from Dr. Fritz Müller, who states that sphinges are frequently found caught in this manner.—Sir Sydney Saunders communicated notes by Mi. M. Lichtenstein, on new ideas as to the life-cycle of aphidians, giving the results of considerable breeding experiments.—The Secretary read a paper from Dr. Fritz Müller entitled "Notes on Brazilian Entomology," in which the author gave the results of his observations on the odours emitted by butterflies and moths, as well as facts bearing on various other subjects more or less connected with the theory of evolution. In reference to this paper the wings of *Antirrhæa archæa* from Brazil, and of *Mycalesis drusia* from the Nicobars were exhibited, in illustration of the author's theory of "scent-fans."—The following papers were also communicated: "On some longicorn Coleoptera from the Hawaiian Islands," by Dr. Sharp. "On the Larvæ of the Tenthredinidæ, with Special Reference to Protective Resemblance," by Mr. Peter Cameron; and "On *Macropsebium coterelli*, and other New Species of Coleoptera from Lake Nyassa," by Mr. H. W. Bates. The author exhibited the remarkable longicorn beetle above designated, which possessed some prominent characters of the Prionidæ.

Royal Microscopical Society, June 5, 1878.—H. J. Slack, president, in the chair.—Major O'Hara and Dr. J. Edmunds were elected Fellows of the Society.—A paper by Prof. Keith, on the results of a computation relating to Tolles' ⅙-objective, was read by the Secretary.—Prof. Stokes read a paper on the question of a theoretical limit to the apertures of microscopical objectives, in which he showed that, theoretically, a pencil of rays from a radiant in glass (or under equivalent conditions) of 180° could be refracted by a single refraction at a spherical surface, so as to present to the second lens a pencil of about 81° free from spherical aberration; and, while not asserting the possibility of utilising the whole of the pencil of 180° in glass, he thought a very large part of it might be available in a practical construction—a far larger part than can be used with dry lenses. The subject was further discussed by Messrs. Ingpen, Stephenson, and Mayall.—The other papers were on the measurement of the diameter of the flagella of *Bacterium termo*, by the Rev. W. H. Dallinger; on the framework of the mastax of *Melicerta ringens*, by Mr. F. A. Bedwell; a translation by Mr. Kitton of a paper by M. Petit on some new genera and species of diatoms; and a note by Mr. J. H. Stephenson on the effect produced on *Pleurosigma angulatum* by stopping out the central dioptric pencil. Mr. Stephenson exhibited, after the meeting, *Pleurosigma angulatum*, with his new oil-immersion lens, under the conditions explained in his paper; and Mr. Mayall demonstrated the aperture of Tolles' ⅙-objective, by Abbe's apertometer, to be largely in excess of the maximum possible for dry lenses. Some extremely good slides of the mastax of *Melicerta* and *Conochilus*, mounted by Lord S. G. Osborne, which had been sent by Mr. Bedwell, were also exhibited.

Meteorological Society, June 19.—Mr. C. Greaves, F.G.S., president, in the chair.—J. C. Philips and W. S. Rawson were elected Fellows.—The following papers were then read:—The climate of Lundy Island, by A. J. H. Crespi, B.A., F.M.S. Lundy Island, from its geographical position, might be expected to have a mild, damp climate, with cool summers and warm winters, and a small diurnal range of temperature, and so, no doubt, it has, although certain local circumstances in addition to its peculiar configuration make the climate remarkably inclement, windy, and unpleasant. The island runs nearly due north and south, having an extreme length of four miles and a breadth of from 200 yards to 1,600 or 1,800; there is a nearly flat table-land or "top" running due north and south, having an altitude of 450 feet; shelter there is none, every current of wind sweeps the whole table-land. From the edge of this table-land the ground slopes away to the sea; sometimes the descent of the side-land is extremely abrupt, at other spots more gradual, while the side-lands are deeply cut by caves, precipices, small bays, and glens. All around the island the water is deep a few hundred yards off, while the currents are formidable, and tremendous seas break upon the rocks almost every day in the year. The *one* drawback of the place is the wind, so furious and continuous are the blasts first from one quarter, then from another, for days and even weeks. When gales occur, as they generally do at short intervals, the force of the wind becomes incredible: walls are torn down, gates and doors wrenched out of their fastenings, and the few buildings which can be blown down are more or less injured. Fogs are remarkable for their frequency and density, and are nearly always drenching. The rainfall is nearly 50 inches per annum. February and March are said to be the coldest months and August the hottest; the mean temperature of the year is about 50° or 51°.—On the auroral or magnetic cirrus, by the Rev. S. Barber, F.M.S.—Contributions to the meteorology of Natal, by Dr. R. J. Mann, F.R.A.S. This paper is a discussion of the observations taken at Maritzburg (2095 feet above sea-level) during the six years 1860–65; from it we learn that the summer of Natal is a season of copious rain and the winter a season of relative dryness; also that the former is a time of abundant and frequent cloud, and the latter a time of preponderant sunshine. The summer is consequently cooler in a material degree than it would otherwise be, on account of the frequent prevalence of cloud and the abundance of the rainfall; and the winter has its temperature materially raised from the constant occurrence of clear skies and bright sunshine. The mean annual rainfall was 31·13 inches, of which amount nearly 28 inches came down during the six summer months (October to March), and scarcely more than 2 inches during the four midwinter months (May to August). Thunderstorms are of frequent occurrence, the average exceeding seven per month from October to March. The thermometer rarely rises above 85° in the shade even in the summer months, unless a hot wind is blowing; it then mounts to somewhere between 85° and 97° according to the strength of the sirocco. The degree of humidity indicated by the dry and wet bulb thermometers when a hot wind is blowing varies from 25° to 52° of moisture. The highest temperature recorded during the six years was 97°·6, the lowest 29°, and the mean 63°·3.—Note on the mean relative humidity at the Royal Observatory, Greenwich, by W. Ellis, F.R.A.S. In this paper the author gives the mean relative humidity in each month of the year at 9 A.M. and 9 P.M., and the mean of the twenty-four hourly values, derived from the photographic records of the dry and wet bulb thermometers for the twenty years 1849-1868. The 9 A.M. value is smaller than the mean in summer and larger in winter; and the 9 P.M. value is larger than the mean throughout the year, but most in summer. The mean monthly values change little from April to August, and from October to February; and there is a great decrease between February and April, and a corresponding great increase between August and October. The mean for the year is 80·7.—On a method of sometimes determining the amount of the diurnal variation of the barometer on any particular day, by the Hon. R. Abercromby, F.M.S.—On the relative duration of sunshine at the Royal Observatory, Greenwich, and at the Kew Observatory, during the year 1877, by G. M. Whipple, B.Sc., F.R.A.S. The author having instituted a comparison of the amount of sunshine recorded at these two observatories, finds that the totals show that for the whole year the excess in the number of hours the sun shone at Kew over the number at Greenwich, amounted to 171. This difference is no doubt due to the direction of the wind, for Greenwich lying to the south-east of the chief part of London, and having also large manufacturing establishments on its northern side, is greatly shaded by cloud, probably in a great measure due to smoke, when the wind blows from W., N.W., or N., while at Kew, which is situated to the west of London, and is remote from factories and shipping, enjoys a larger percentage of sunshine with these winds. With winds from the N.E., S., and S.W., Kew has but slight advantage over Greenwich. With E. and S.W. winds the London smoke is driven over Kew, and its presence in reducing the transparency of the air is evident in the diminished amount of sun recorded, the quantities being only 81 and 65 per cent. of those registered at Greenwich.—Account of the atmospheric disturbance which took place in lat. 21° N., and long. 25° W., on January 27-28, 1877, by J. H. Cardew.—Notes on some remarkable cloud formations accompanying sudden and frequent changes of temperature and wind, by Capt. W. Watson, F.M.S.

VIENNA

Imperial Academy of Sciences, February 28.—The following, among other papers, were read:—On some sensations in the region of visual nerves, by M. Brücke.—On the galvanic polarisation of platinum in water, by M. Exner.

PARIS

Academy of Sciences, July 1.—M. Fizeau in the chair.—The following among other papers were read:—On sulphuric saponification, by M. Fremy. He expresses his satisfaction because this process, *without distillation* (which discoloured the fatty acids), is now become an industrial operation, as the Exhibition proves.—On a system of telephone without electromagnetic organs, based on the principle of the microphone, by M. du Moncel. A reference to recent results by Blyth, Hughes, &c., in this direction. He thinks some of the sounds heard in telephones connected with telegraph lines may arise from friction of the lines on their supports.—On diphtheria in the East and especially in Persia, by M. Tholozan. There is no record or tradition of croup, scarlatina, or diphtheritic or gangrenous angina in Persia previous to 1869. In that year and the next a small epidemic of scarlatina appeared. In 1874 an epidemic of diphtheria broke out in the south of Persia and spread towards the north and west. Particulars are given.—M. Friedel was elected member in the section of chemistry in room of the late M. Regnault.—Thermal researches on the chromates, by M. Morges. The electrolytic decomposition of the chromates is not comparable to that of the alkaline sulphates. The heat confined does not exceed 12,500 calories. The chromates are rather comparable (thermally) to the carbonates.—*Trombe* of May 15, 1878, in the department of Vienne, by M. De Touchimbert. This appears to have been very violent, uprooting strong trees, damaging houses, lifting railway carriages, and throwing persons down. Its course (about forty kiloms.) was from S.S.W. to N.N.E. and E. Its width was 1,000 to 1,200 m.; velocity about 44 m. per second; pressure about 220 kilog. per square metre.—On the deformations of the disc of Mercury during its transit, by M. Lamez. Calculation shows that an advance of 8 sec. on the theoretical instant of contact may have been produced by the ellipticity; and an advance was observed.—On a single liquid pile depolarised by the action of atmospheric air, by M. Pulvermacher. The exciting liquid, (dilute sulphuric acid, caustic potash, or sal ammoniac) is placed in a porous cylindrical vessel. The positive metal is a rod of amalgamated zinc placed in this vessel, and the negative consists of long bell-springs of fine wire (silver or platinum) coiled round the cylinder, their coils sufficiently apart to avoid capillary action. The wire is thus in contact at a great many points with the liquid which transudes the porous vessel, and the external air has a continual oxidising action on these numerous small surfaces of tangence, thus effecting depolarisation.—On a new mode of formation of glycolate of ethyl, by MM. Norton and Tchermak. This is by action of glycolide on ethylic alcohol.—On the action of chlor-hydrates of amines on glycerine, by M. Persoz. On heating, *e.g.*, glycerine with chlorhydrate of aniline, one easily obtains phenylised derivatives of glyceramine along with secondary products.—On anærobiosis of micro-organisms, by M. Gunning. With the aid of ferrocyanide of ferrosum, which he found an extremely sensitive reagent for oxygen, he had shown that the apparatus and media commonly used for culture of micro-organisms cannot be freed from oxygen by the methods recommended for this purpose. In a memoir to the Amsterdam Academy, he gives arguments for attributing the cessation of putrefaction solely to the death of the bacteria, caused by absence of free oxygen. M. Pasteur considers that putrefaction is sometimes stopped because the small organisms have passed into the state of germs.—On the "piedra," a new species of parasitic affection of hair, by M. Desenne. This consists of hard nodosities (visible to the naked eye) at regular intervals on the hair. It is met with in the province of La Cauca, Columbia. It is cured by greasing the head well, and is not contagious.—On the explanation of the effects of irrigations practised in the south of France, by M. Barral. These are important, not only on account of the matters brought by the water, and the satisfaction of the need of moisture, but on account of the reactions they favour in the layer of earth necessarily moistened, aërated, and put in contact with mineral or organic compounds.—Letter from Prof. Du Bois Reymond presenting two new volumes of his researches on the physics of the muscles and the nerves. They contain memoirs published since 1855.—A memoir by Prof. Villari was presented, on emissive power and the different kinds of heat which some bodies emit at 100°.

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